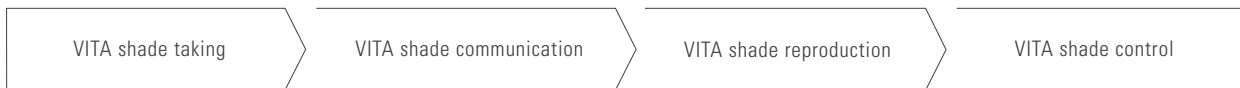
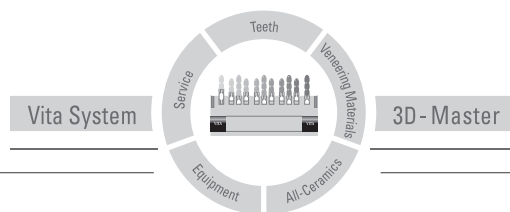


Questions and Answers on Metal Ceramics



Date of issue: 05.09



VITA



1. Two ceramic layers did not bond	4
2. Chipping	5
3. Tearing	6
4. Bubbles	7
5. Shade too grey after firing	8
6. Shade too pale after firing	8
7. Pinholing in the surface	9
8. Black dots in the ceramic	9
9. Errors during firing	10
10. Cracks in the metal ceramic	10
11. Clouding in the ceramic	12
12. Deformation of substructures	13
13. Bonding problems – metal/ceramic	14
14. Discolorations	14
15. Marginal recessions	15



1. Two ceramic layers did not bond

Please check the following which could have caused the problem:

- Do not place freshly layered and moist ceramic directly into the hot furnace.
- Ensure correct firing parameters and firing temperature; if required check furnace temperature. Carry out muffle test by using a mirror to see if the muffle is properly heated from all sides in the firing chamber.
- If a rubber polisher is used before final finishing (glaze firing), the surface must not be wetted with liquid again. It must first be cleaned. It is not sufficient to clean it using a steam cleaner or with water. Silicone residue must be removed mechanically from the surface.
- Insulation material residue must not be on the ceramic surface. Contact with the freshly-insulated antagonist teeth (opposing jaw) can lead to problems.
- The correction porcelain should not be applied in very small portions. Make sure it does not dry out excessively; if necessary use a liquid which keeps it moist longer (VITA MODELLING FLUID).
- Avoid constant blotting and wetting of the material.
- When filling the interdental spaces during bridge correction, do not vibrate the material excessively; otherwise the material will not bond. Interdental spaces should be wetted with an oily liquid (e.g. Interno) before filling.



2. Chipping

Please check the following which could have caused the problem:

- When modelling in wax, the minimum recommended layer thicknesses should be adhered to right from the beginning to ensure that a minimum layer thickness of 0.3 mm remains after finishing. Follow manufacturers' instructions regarding alloys. Non-precious metal alloys and high gold content alloys require different wall thicknesses.
- Model in reduced tooth size particularly in the case of molars and bridges in order to achieve a homogeneous layer thickness of the ceramic. Ensure cuspal support in the posterior area, and U-shaped modelling of the interdental spaces. Sharp edges must be avoided.
- Sprue the pattern according to the manufacturer's instructions. Observe the information on storage, expiration dates and processing for the investment material.
- Casting: ensure correct flame adjustment and temperature of induction or electronic casting equipment. Use the casting crucible and temperature recommended for the alloy.
- Never mix alloys. Do not use more than one third of old metal.
- Do not separate directly at the coping so that the sprue area can still be easily adjusted.
- Ensure homogeneous metal structure; if possible avoid soldering or lasering.
- Make sure to use clean sandblasting material and observe the manufacturer's instructions. Do not use any circuit blasting units.
- Before using etching agents, clean the restoration thoroughly.
- Trim with clean, cross-cut tungsten carbide burs. Do not apply too much pressure and use the appropriate rotation speed depending on the alloy.
- Avoid heat development at the surface. Do not use abrasives for different alloys when finishing. Do not use diamond abrasives or diamond-coated rubber polishers for finishing.
- Finish the entire surface of the crown or bridge in order to remove any reaction products of the alloy surface and the investment material or impurities in the surface. Finish the interdental spaces.
- Sandblast with particle size of 50 - 250 μm depending on the alloy. Adhere to recommended sandblasting pressure for different alloys and sandblast at an angle of 45° to avoid the risk of penetration of the abrasive material into the alloy. Use disposable abrasives and ensure that the sandblasting material is clean (observe alloy manufacturer's instructions).
- Ensure correct firing parameters and firing temperature. Carry out muffle test by using a mirror to see if the muffle is properly heated from all sides in the firing chamber.
- Grind the surface of the ceramic with diamond abrasives. Make sure the ceramic does not get too hot. When using blunt diamonds, do not increase the grinding pressure, but replace the tool. When using a turbine, always use water cooling.



3. Tearing

Please check the following which could have caused the problem:

- Model in reduced tooth size particularly in the case of molars and bridges in order to achieve a homogeneous layer thickness of the ceramic. Ensure cuspal support in the posterior area, and U-shaped modelling of the interdental spaces.
- Casting: ensure correct flame adjustment and temperature of induction or electronic casting equipment. Use the casting crucible and temperature recommended for the alloy.
- Never mix alloys. Do not use more than one third of old metal.
- Make sure to use clean sandblasting material and observe the manufacturer's instructions. Do not use any circuit blasting units.
- Finish the entire surface of the crown or bridge in order to remove any reaction products of the alloy surface and the investment material or impurities in the surface. Finish the interdental spaces.
- Various manufacturers no longer recommend oxidation firing. However, when changing alloys, oxidation firing should be carried out. It serves to check the oxide color, which must be homogeneous with the shade. There must be no stains or discolorations on the surface to be veneered. The oxide layer can be subsequently removed by sandblasting or etching.
- When mixing all ceramic materials, ensure that no bubbles are formed. Ensure that the liquid is added to the powder from the side and the material is mixed thoroughly using a glass or agate spatula. The use of metal spatulas can lead to metal abrasion and discoloration of the ceramic.
- Keep workplace clean: metal dust and dirty brush water can lead to problems.
- Application of insulating liquid should not be too thick.
- When firing bridges, always separate down to the opaque at the first firing. Shrinkage of the ceramic always occurs only in the thickest area. Therefore a uniform layer thickness is recommended. Do not use any dry or saw-toothed instruments. The use of these instruments can cause the ceramic to become detached and separated from the surface.
- Ensure correct firing parameters and firing temperature. Carry out muffle test by using a mirror to see if the muffle is properly heated from all sides in the firing chamber.
- If a rubber polisher is used before the final finishing, the surface must not be wetted with liquid again. It must first be cleaned. It is not sufficient to clean it using a steam cleaner or with water. Silicone residue at the surface must be removed mechanically.
- Insulating material residue must not be on the ceramic surface. Contact with the freshly insulated antagonist teeth may also lead to problems.
- When filling the interdental spaces during bridge correction, do not vibrate the material until dry; otherwise the material will not bond. Interdental spaces should be wetted with an oily liquid (e.g. VITA INTERNO) before filling.



4. Bubbles

Please check the following which could have caused the problem:

- Investment material was not correctly mixed (observe manufacturer's instructions and expiration date).
- Check if the surface of the metal substructure exhibits any porosity.
- Never mix alloys. Do not use more than one third of old metal.
- Do not separate directly at the coping so that the sprue area can still be easily adjusted.
- If possible, avoid soldering or lasering.
- Make sure sandblasting material is clean. Observe the alloy manufacturer's instructions. Do not use any circuit blasting units. Sandblast at an angle of 45° to the surface to avoid the risk of penetration of abrasive material into the alloy.
- When using etching agents, the restoration needs to be carefully cleaned afterwards.
- Finish with clean, cross-cut tungsten carbide burs. Do not apply too much pressure and use the appropriate rotation speed depending on the alloy.
- Avoid heat development on the surface. Do not use abrasives for finishing different alloys.
- Do not use diamond abrasives or diamond-coated rubber polishers for finishing.
- Finish the entire surface of the crown or bridge in order to remove any reaction products of the alloy surface and the investment material or impurities in the surface. Finish the interdental spaces.
- Grind in one direction in order to avoid overlapping.
- Sandblast with particle size of 50 - 250 µm depending on the alloy. Adhere to recommended sandblasting pressure for different alloys and sandblast at an angle of 45° to avoid the risk of penetration of abrasive material into the alloy. Use disposable abrasives and ensure that sandblasting material is clean (observe alloy manufacturer's instructions).
- Depending on the oxide surface etching is recommended by different manufacturers; the surface is "refined" by dissolving impurities. It is vital to clean the substructures thoroughly and make sure that no etching residue remains on the surface.
- Various manufacturers no longer recommend oxidation firing. However, when changing alloys, oxidation firing should be carried out. It serves to check the oxide color, which must be homogeneous with the shade. There must be no stains or discolorations on the surface to be veneered. The oxide layer can be subsequently removed by sandblasting or etching.
- The wash opaque must be applied in accordance with the working instructions to achieve good wetting of the surface. To ensure correct melting of the opaque, the required temperature must be adhered to. The use of wash opaque is not mandatory; wash opaque firing can also be carried out with the regular opaque porcelain (colored).
- When mixing all ceramic materials, ensure that no bubbles are formed. Ensure that the liquid is added to the powder from the side and the material is mixed thoroughly using a glass or agate spatula. The use of metal spatulas can lead to metal abrasion and discoloration of the ceramic. Keep workplace clean; metal dust and dirty brush water can lead to problems.
- Application of insulating liquid should not be too thick.
- Ceramics should not be mixed with modelling liquid but with distilled water when remixing them. It must also be ensured that the mixture is bubble-free. Ensure a homogeneous moisture level of the layered ceramic on the crown. Do not keep re-wetting or allow it to dry out.
- Burs may only be used for processing one material.
- Do not use burs which have been previously used for grinding titanium.



5. Shade too grey after firing

Please check the following which could have caused the problem:

- The wash opaque must be applied in accordance with the working instructions to achieve good wetting of the surface. To ensure correct melting of the opaque, the required temperature must be adhered to. The use of wash opaque is not mandatory; the wash opaque firing can also be carried out with the regular opaque porcelain (colored).
- After applying, the opaque should mask the surface completely to ensure reliable reproduction of the shade; if necessary it must be applied a second time.
- When mixing ceramic materials, ensure that no bubbles are formed. Ensure that the liquid is added to the powder from the side and the material is mixed thoroughly using a glass or agate spatula. The use of metal spatulas can lead to metal abrasion and discoloration of the ceramic. Keep workplace clean; metal dust and dirty brush water can lead to problems.
- Application of insulating liquid should not be too thick.
- Insulation material residue must not be on the ceramic surface. Contact with the freshly-insulated antagonist teeth (opposing jaw) can lead to problems.
- Opaque does not completely mask the surface.
- Firing temperature too high or too low; ensure correct firing parameters and firing temperature. Carry out muffle test by using a mirror to see if the muffle is properly heated from all sides in the firing chamber
- Too much Transpa Dentine used.
- Veneer thickness is not sufficient; to ensure reliable shade reproduction, a layer thickness of ≥ 0.6 mm is required.

6. Shade too pale after firing

Please check the following which could have caused the problem:

- Ceramics should not be mixed with modelling liquid but with distilled water when remixing them. It must also be ensured that the mixture is bubble-free. Ensure a homogeneous moisture level of the layered ceramic on the crown. Do not keep re-wetting or allow it to dry out. Burs may only be used for processing one material.
- Ensure correct firing parameters and firing temperature.
- Insulation material residue must not be on the ceramic surface. Contact with the freshly-insulated antagonist teeth (opposing jaw) can lead to problems.
- Firing temperature too low.
- Not enough Base Dentine used.
- Too much Transpa Dentine used.
- Too much dentine used.
- Veneer thickness is not sufficient enough to ensure reliable shade reproduction, a layer thickness of ≥ 0.6 mm is required.



7. Pinholing in the surface

Please check the following which could have caused the problem:

- When mixing all ceramic materials, ensure that no bubbles are formed. Ensure that the liquid is added to the powder from the side and the material is mixed thoroughly using a glass or agate spatula. The use of metal spatulas can lead to metal abrasion and discoloration of the ceramic. Keep workplace clean; metal dust and dirty brush can lead to problems.
- Application of insulating liquid should not be too thick.
- Ceramics should not be mixed with modelling liquid but with distilled water when remixing them. It must also be ensured that the mixture is bubble-free. Ensure a homogeneous moisture level of the layered ceramic on the crown. Do not keep re-wetting or allow it to dry out.
- The correction porcelain should not be applied in very small portions. Make sure it does not dry out too much; if necessary use a liquid which keeps it moist longer.
- Avoid frequent suction and rewetting of the material; a homogeneous moisture level is required.

8. Black dots in the ceramic

Please check the following which could have caused the problem:

- When mixing all ceramic materials, ensure that no bubbles are formed. Ensure that the liquid is added to the powder from the side and the material is mixed thoroughly using a glass or agate spatula. The use of metal spatulas can lead to metal abrasion and discoloration of the ceramic.
- Keep workplace clean; metal dust and dirty brush water can lead to problems.
- Application of insulating liquid should not be too thick.



9. Errors during firing

Please check the following which could have caused the problem:

- Ensure good marginal adaptation of the ceramics; if necessary brush the ceramic in these areas before firing (use a dry brush).
- When firing bridges, always separate down to the opaque at the first firing. Shrinkage of the ceramic always occurs only in the thickest area. Therefore a uniform layer thickness is recommended. Do not use any dry or saw-toothed instruments. The use of these instruments can cause the ceramic to become detached and separated from the surface.
- The crown has a "lifeless" appearance or exhibits insufficient translucency (may also be caused by unsuitable liquid).
- Crown has a glassy appearance or round edges after firing; check the firing temperature accuracy.

10. Cracks in the metal ceramic

Please check the following which could have caused the problem:

- When modelling in wax, the minimum layer thicknesses should be adhered to right from the beginning to ensure that a minimum layer thickness of 0.3 mm remains after finishing. Follow manufacturers' instructions regarding alloys. Non-precious metal alloys and high gold content alloys require different wall thicknesses.
- Model in reduced tooth size particularly in the case of molars and bridges in order to achieve a homogeneous thickness of the ceramic. Ensure cuspal support in the posterior area and U-shaped modelling of the interdental spaces. Sharp edges must be avoided.
- Sprueing of the model according to the manufacturer's instructions. Observe the information on storage, expiration dates and processing for the investment material.
- Casting: ensure correct flame adjustment and temperature of induction or electronic casting equipment. Use the casting crucible and temperature recommended for the alloy.
- Never mix alloys. Do not use more than one third of old metal.
- Do not separate directly at the coping so that the sprue area can still be easily adjusted.
- Ensure homogeneous metal structure; if possible avoid soldering or lasering.
- Make sure to use clean and suitable sandblasting material (manufacturer's instructions).
- Before using etching agents clean (ultrasonic unit), the restoration thoroughly.



- Trim with clean, cross-cut tungsten carbide burs. Do not apply too much pressure and use the given rotation speed depending on the alloy.
- Avoid heat development at the surface. Do not use abrasives for different alloys for finishing. Do not use diamond abrasives or diamond-coated rubber polishers for finishing.
- Finish the entire surface of the crown or bridge in order to remove any reaction products of the alloy surface with the investment material or impurities in the surface. Finishing should also be carried out in the interdental spaces.
- Sandblast with particle size of 50 - 250 μm depending on the alloy. Adhere to recommended sandblasting pressure for different alloys and sandblast at an angle of 45°. Use disposable abrasives and ensure that sandblasting material is clean.
- The wash opaque must be applied in accordance with the working instructions to achieve good wetting of the surface. To ensure correct melting of the opaque, the required temperature must be adhered to. The use of wash opaque is not mandatory; the wash opaque firing can also be carried out with the regular opaque porcelain (colored).
- Observe the CTE of the alloy. The CTE of the ceramic must generally be lower than that of the metal. Experience gathered over numerous years has shown that the use of alloys with a CTE between 14 - 14.4, measured at 25-600 °C, produces very good results. If the CTE value of the alloy is higher, the temperature range between 900 °C to 700 °C must not be passed in less than three minutes during the cooling phase. However, this does not apply to each alloy. In individual cases successful firing performed by VITA Zahnfabrik may differ from the recommendations of the alloy manufacturers.
- When firing bridges, always separate down to the opaque at the first firing. Shrinkage of the ceramic always occurs only in the thickest area. Therefore a uniform layer thickness is recommended. Do not use any dry or saw-toothed instruments. The use of these instruments can cause the ceramic to become detached and separated from the opaque surface.
- Various manufacturers no longer recommend oxidation firing. However, when changing alloys, oxidation firing should be carried out. It serves to check the oxide shade, which must be homogeneous in shade. There must be no stains or discolorations on the surface to be veneered. The oxide layer can be subsequently removed by sandblasting or etching.
- Ensure correct firing parameters and firing temperature. Carry out muffle test by using a mirror to see if the muffle is properly heated from all sides in the firing chamber.
- Grind the surface of the ceramic with diamond abrasives. Make sure the ceramic is not ground when too hot. When using blunt diamonds, do not increase the grinding pressure but replace the tool. When using a turbine, always ensure water cooling.



11. Clouding in the ceramic

Please check the following which could have caused the problem:

- Ensure correct firing parameters and firing temperature. Carry out muffle test with mirror to see if muffle is properly heated from all sides.
- Insulation material residue must not be on the ceramic surface. Contact with the freshly insulated antagonist teeth (opposing jaw) can lead to problems.
- The correction porcelain should not be applied in very small portions. Make sure it does not dry out too much; if necessary use a liquid which keeps it moist longer.
- Firing temperature is too low.
- Avoid constant suction and rewetting of the mixture; ensure homogeneous moisture level.



12. Deformation of substructures

Please check the following which could have caused the problem:

- General preparation guidelines must be observed.
- When modelling in wax, the minimum layer thicknesses should be adhered to right from the beginning to ensure that sufficient material remains also after finishing.
- Observe manufacturers' instructions regarding alloys.
- Non precious metal alloys and high gold content alloys require different wall thicknesses.
- Sprueing of the modellation according to the manufacturer's instructions.
- Observe information on storage, expiration dates and processing of the investment material.
- Observe the manufacturer's instructions on processing of the respective metal (alloy).
- Ensure correct firing parameters and firing temperature. Carry out muffle test with mirror to see if muffle is properly heated from all sides.
- Ensure correct flame adjustment and temperature of induction or electronic casting equipment.
- Use the casting crucible recommended for the alloy. Do not cast different alloys in a single crucible.
- Never mix alloys. Do not use more than one third of old metal.



13. Bonding problems – metal/ceramic

Please check the following which could have caused the problem:

- Casting: ensure correct flame adjustment and temperature of induction or electronic casting equipment. Use the casting crucible and temperature recommended for the alloy.
- Never mix alloys. Do not use more than one third of old metal.
- The wash opaque must be applied in accordance with the working instructions to achieve good wetting of the surface. To ensure correct melting of the opaque, the required temperature must be adhered to. The use of wash opaque is not mandatory; the wash opaque firing can also be carried out with the shaded opaque porcelain.
- Bubbles or discolorations at the surface of the opaque must be avoided. The opaque must have a surface glaze.
- Freshly layered porcelain must not be preheated too quickly and at excessive temperatures.
- When filling the interdental spaces during bridge correction, do not vibrate the material until dry; otherwise the material will not bond. Interdental spaces should be wetted with an oily liquid (e.g. VITA INTERNO FLUID) before filling.

14. Discolorations

Please check the following which could have caused the problem:

- Observe information on storage, expiration dates and processing of the investment material.
- Casting: ensure correct flame adjustment and temperature of induction or electronic casting equipment. Use the crucibles and temperature recommended for the alloy.
- Use the crucibles recommended for the alloy.
- Ensure homogeneous metal structure; if possible avoid soldering or lasering.
- Use recommended ceramic mixing liquid and observe the firing temperature.

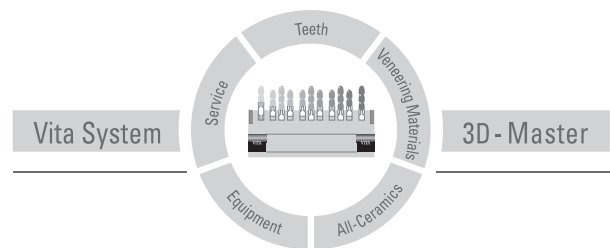


15. Marginal recessions

Please check the following which could have caused the problem:

- Model in reduced tooth size particularly in the case of molars and bridges in order to achieve a homogeneous layer thickness of the ceramic. Ensure cuspal support in the posterior area, and U-shaped modelling of the interdental spaces.
- The opaque must be applied in accordance with the working instructions. To ensure proper melting of the opaque, the correct temperature must be adhered to.
- Avoid bubbles or discolorations at the surface of the opaque.
- Ensure good marginal adaptation of the ceramics; if necessary brush the ceramic in these areas before firing (use a dry brush).
- When firing bridges, always separate down to the opaque for the first firing. Shrinkage of the ceramic always occurs only in the thickest area. Therefore a uniform layer thickness is recommended. Do not use any dry or saw-toothed instruments. The use of these instruments can cause the ceramic to become detached and separated from the surface.
- Should a rubber polisher be used before the final finishing, the surface must not be wetted with liquid again. It must first be cleaned. It is not sufficient to clean it using a steam cleaner or with water. Silicone residue at the surface must be removed mechanically.
- Insulation material residue must not be on the ceramic surface. Contact with the freshly-insulated antagonist teeth (opposing jaw) can lead to problems.

With the unique VITA SYSTEM 3D-MASTER all natural tooth shades are systematically determined and completely reproduced.



Please note: Our products should be used according to the working instructions. We cannot be held liable for damages resulting from incorrect handling or usage. The user is furthermore obliged to check the product before use with regard to its suitability for the intended area of applications. We cannot accept any liability if the product is used in conjunction with porcelains and equipment from other manufacturers which are not compatible or not authorized for use with our product. Furthermore, our liability for the correctness of this information is independent of the legal ground and, in as far as legally permissible, is limited to the invoiced value of the goods supplied excluding turnover tax. In particular, as far as legally permissible, we do not assume any liability for profit loss, for indirect damages, for consequential damages or for claims of third parties against the purchaser. Claims for damages based on fault liability (culpa in contrahendo, breach of contract, unlawful acts, etc.) can only be made in the case of intent or gross negligence.

Date of issue: 05.09.

US 5498157 A · AU 659964 B2 · EP 0591958 B1

VITA

VITA Zahnfabrik H. Rauter GmbH & Co.KG
Postfach 1338 · D-79704 Bad Säckingen · Germany
Tel. +49(0)7761/562-0 · Fax +49(0)7761/562-299
Hotline: Tel. +49(0)7761/562-222 · Fax +49(0)7761/562-446
www.vita-zahnfabrik.com · info@vita-zahnfabrik.com